

Chapter 7. Introduction to Euclid's Geometry

Exercise 7.1

1.) Define the following terms:

i) Line segment

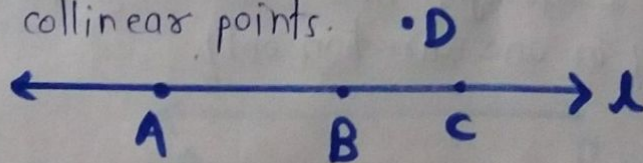
- Line segment is a line which connects two points or we can also define a line segment means the shortest distance between two points.
- A line segment is one dimensional.



Here AB is the line segment.

ii) Collinear points:

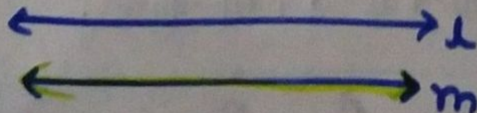
- If the two or more points lie on the same line then that points are called as collinear points.



Here, points A, B & C are collinear points.

iii) Parallel lines:

- The two lines in a plane are said to be parallel lines if they do not intersect each other at infinity also after extension.



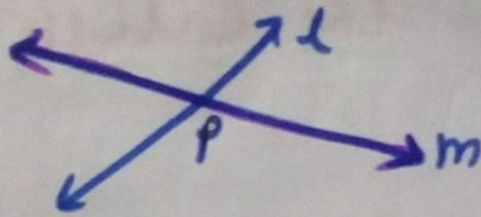
Here, lines l & m are parallel lines.

i) Intersecting lines:

Two lines are said to be intersecting lines if they have a common point, and the common point is called as point of intersection.

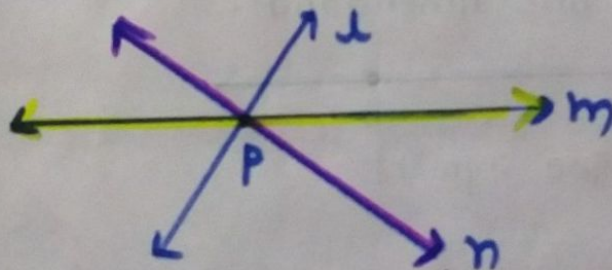
Here, lines l & m are intersecting lines &

point ' P ' is their point of intersection.



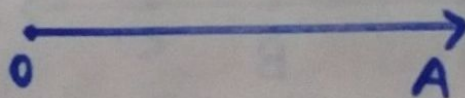
v) Concurrent lines:

The two or more lines are said to be concurrent lines if there is a point which lies on all of them.



Here, lines l , m & n are concurrent lines.

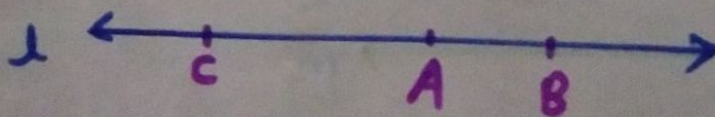
vi) Ray: Ray is a straight line extending from a point indefinitely in one direction only.



Here, OA is a ray.

vii) Half-line:

Let us suppose, if A, B, C be the points on a line l , such that A lies between B & C & we delete the point A from line l , then two parts of that line l are remained. And each part is called as a half-line.

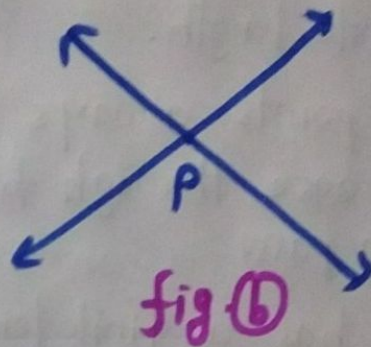
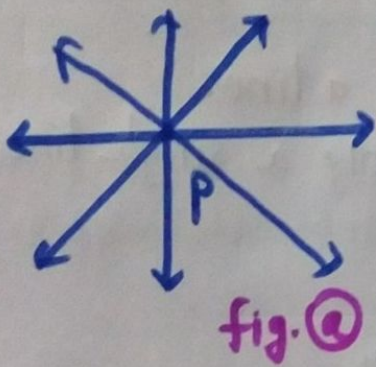


2) i) How many lines can pass through a given point?

→ Infinitely many lines can pass through a given single point as shown below in fig. (a)

ii) In how many points can two distinct lines at the most intersect?

→ In only one point two distinct lines at the most intersect as shown in fig. (b)

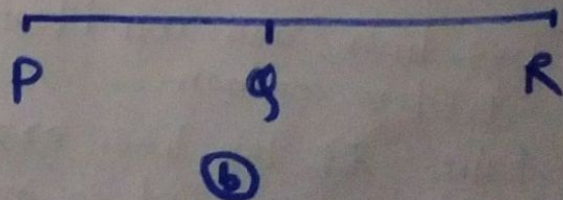


3) i) Given two points P & Q. find how many line segments do they determine.

→ For given two points P & Q. Only one line segment they determine as shown in fig. (a)

ii) Name the line segments determined by the three collinear points P, Q & R.

→ If three points P, Q, R are collinear points then the three line segments namely PQ, QR, PR they determine as shown in fig. (b)



4) Write the truth value (T/F) of each of the following:

→ i) Two lines intersect in a point.
True. Two lines may intersect in a single point.

→ ii) Two lines may intersect in two points.
False. Because two lines intersect only in a single point.

→ iii) A segment has no length.
False. A segment means a part of line which has definite length.

→ iv) Two distinct points always determine a line.
True. Because through two points only a single line can pass.

→ v) Every ray has a finite length.
False. Because ray has infinite length.

→ vi) A ray has one end-point only.
True. A ray has only one end point.

→ vii) A segment has one end-point only.
False. A segment has two end-points.

→ viii) The ray AB is same as ray BA.
False.

→ ix) Only a single line may pass through a given point.
False. Because infinitely many lines can pass through a given point.

→ x) Two lines are coincident if they have only one point in common.
False. If two lines are coincident then they have infinitely many points in common.

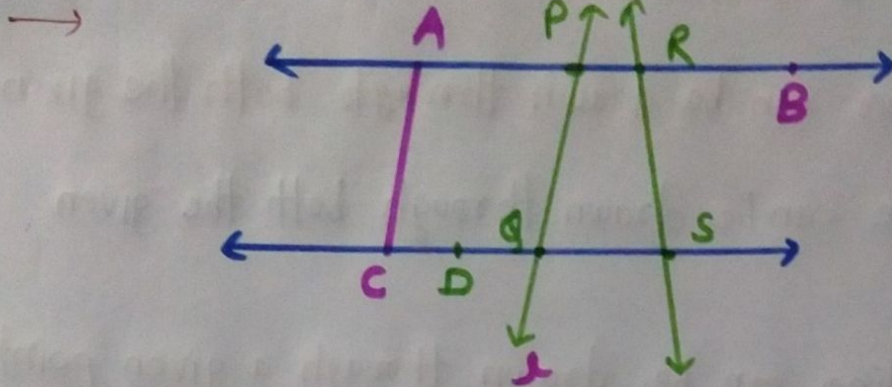
5.) In the fig. below, name the following:

i) five line segments

ii) five rays

iii) four collinear points

iv) Two pairs of non-intersecting line segments.



i) The five line segments found in above fig. are
 $AB, CD, AC, PQ, DS.$

ii) Five rays found in above fig. are:

$\overrightarrow{PA}, \overrightarrow{RB}, \overrightarrow{DC}, \overrightarrow{QS}, \overrightarrow{DS}.$

iii) Four collinear points are: C, D, Q, S

iv) Two pairs of non-intersecting line segments AB & $CD,$
 PB & $LS.$

6.) Fill in the blanks so as to make the following statements true.

i) Two distinct points in a plane determine a unique line.

ii) Two distinct lines in a plane cannot have more than one point in a common.

iii) Given a line & a point, not on the line, there is one & only perpendicular line which passes through the given point & is perpendicular to the given lines.

iv) A line seg separates a plane into three parts namely two half planes & the line itself.

Exercise VSAGs:

- 1.) How many least no. of distinct points determines a unique line.
→ At least two points determines a unique line.
- 2.) How many lines can be drawn through both the given points?
→ Only one line can be drawn through both the given points.
- 3.) How many lines can be drawn through a given point?
→ Infinitely many lines can be drawn through a given single point.
- 4.) In how many points two distinct lines can intersect?
→ In a single point only, two distinct lines can intersect.
- 5.) In how many points a line, not in a plane, can intersect the plane?
→ In a single point a line, not in a plane can intersect the plane.
- 6.) In how many points two distinct planes can intersect?
→ In infinitely many points two distinct planes can intersect.